

## ABSTRACT OF THE DISCLOSURE

A fiber optic readhead arrangement for imaging a scale onto a set of optical fiber receiver channels is disclosed. The readhead arrangement includes an imaging lens and may include an aperture positioned at a focal point of the imaging lens in a telecentric arrangement. An axicon lens may be utilized to direct source light away from the imaging lens and into a ring-shaped annular source lens which surrounds the imaging lens. A source lens may concentrate source light on the scale in an area where it will be imaged back through the imaging lens to the readhead. In one embodiment, multiple source fibers may be provided around the perimeter of the fiber optic readhead arrangement. In another embodiment, the receiver fibers may also function as source fibers. In various exemplary embodiments, high levels of displacement signal interpolation may be achieved to provide high resolution measurement. The fiber optic encoder readhead may be assembled in a particularly accurate and economical manner and may be provided with ultra-miniature overall readhead dimensions.